FLASHES AND PLUGS

YOU DON'T SAY! The *New Yorker* reported that a sign on a telephone booth in the Carlton Hotel in Washington, D. C., reads, *"This telephone is for local and long distance calls only."*

• • •

ALL IN A LIFETIME! *Hibernia,* the Irish digest, records the fact that during a lifetime the average person spends one-tenth of his life as follows: Waiting for meals, 2½ years; answering the door, one year; standing in line, six months; traveling to work, 1½ years; in useless repetition, two months; *answering telephone,* one month, and in making up his mind, 1½ years.

• • •

JACKPOT! Police Officer William Kennedy, Windsor, Conn., was convinced April 20 that he got his nickel's worth when he went to a pay telephone to dial headquarters seven miles away.

The first thing he heard was "San Francisco number one, San Francisco number one."

He started to explain but he was interrupted by a voice which demanded sternly: *"Who are you, anyway?"*

"I am the Windsor, Conn., Police Department," Officer Kennedy replied timidly.

"Well, hold the line a minute," the voice on the other end commanded, "and I'll put you on an international hookup."

With that Kennedy was connected with Alaska, Argentina, Honduras, Scotland and Guadalcanal. Then the voice identified itself to the amazed policeman as a Bell System engineer and explained that he was testing radar equipment.

"You must have a pretty powerful receiver to pick us up," said the engineer. "What are you talking on."

"I," said Officer Kennedy, "am talking on a nickel telephone. But nobody ever told me it was hooked up to an international party line."

• • •

YOUR LIFE IS FLYING BY! The average worker at the age of 35 years has approximately 17,000,000 more minutes to live, reports *Public Service.* Every time he takes a chance to save a minute, he wagers all the remaining 17,000,000 minutes in his life. Are the odds worth it? When you gamble on safety, you bet your life.

• • •

CABBAGE PATCH. Fleeing Germans camouflaged their telephone facilities to make them look like a cabbage patch and a restaurant, but they didn't do the job cleverly enough to fool the members of a Navy Seabee mobile telephone unit at Le Havre, France.

The Germans had abandoned the town in too great a hurry to wreck their elaborate underground facilities, so by the end of the first week the Seabees had found seven vaults with all connecting cables intact. One was concealed under a cabbage patch, and the other was disguised as a cafe-bar.

• • •

OPERATORS More than 140 telephone operators have been required to handle calls at the offices of the Army's New York port of embarkation organization.

TELEPHONY

The Journal of the Telephone Industry

MAY 11, 1946

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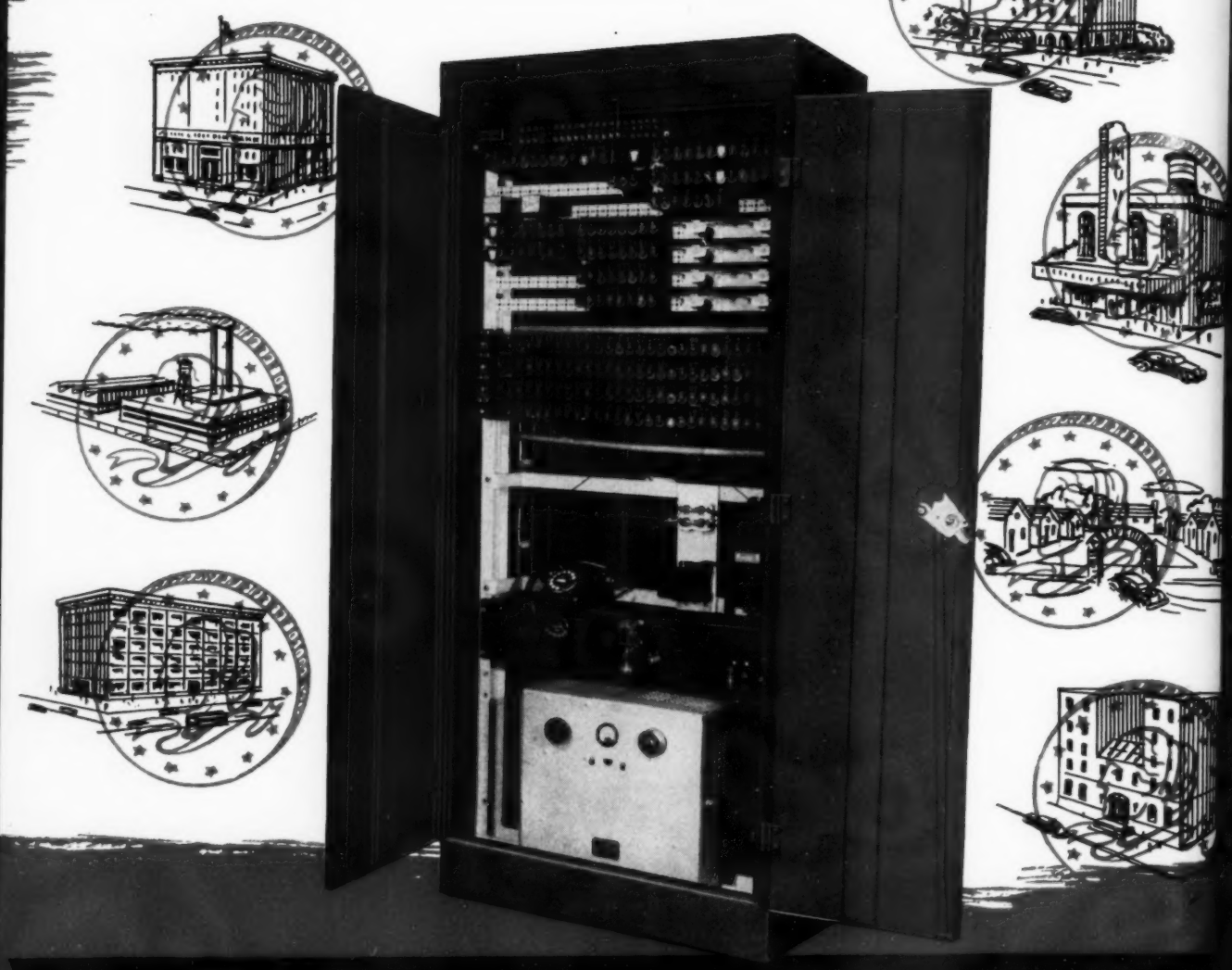
AROUND YOU...



Kellogg Relays Assure Lowest Maintenance Cost

Relays are the key to efficient dial switchboards. They must be *right* . . . must operate dependably under all conditions. There are almost 50 years of Kellogg engineering skill and design behind Relaymatic Switchboards.

You can see the result of this experience in the relays used in the 20-T PABX Switchboard. Because it's an all-relay board, it has no wearing parts such as shafts, cams, plungers or ratchets, that cause trouble and require frequent maintenance.

Precious metal is used on all relay contacts to assure increased dialing range and good connections so important on toll calls.

All relays have twin contacts on special nickel silver springs. This virtually eliminates every possibility of failure—assures maximum service with minimum maintenance.

It is this superiority of relays that makes the Kellogg 20-T PABX Relaymatic Switchboard the reliable board it is. You can depend on it for faithful operation 24-hours a day, 12 months a year for years on end.

CARRIER SYSTEMS

Principles of Operation

By ROBERT C. HUMMEL
Technical Advisor
West Coast Telephone Co.
Everett, Wash.

[EDITOR'S NOTE: *While the carrier telephone systems described in these articles were developed within the Bell System, there has been made available to the industry other efficient, well-designed systems which will be presented in future articles in this publication.*]

* * *

WHEN we consider carrier systems, it has become customary to think of them as providing one or more channels, where each channel is equivalent to a two-way telephone or telegraph circuit. The carrier systems described in these articles were developed within the Bell System which has standardized on several systems for general use to provide telephone or voice frequency channels.

Carrier telephone systems, as used in the United States today, are divided into two groups of systems, namely:

Low Frequency Systems

The "G" System.

The "H" System.

Each system provides one two-way carrier channel in addition to the voice frequency channel on the circuit under the carrier system.

The "C" System.

This system provides three two-way carrier channels in addition to the voice frequency channel on the circuit under the carrier system.

High Frequency Systems

The "J" System.

The "K" System.

Each system provides 12 two-way carrier channels in addition to the voice frequency channel on the circuit under the carrier system.

In this classification, the term two-way carrier channel refers to the derived or carrier channel transmitting the band of frequencies approximately 2,800 cycles in width; between 350 and 3,150 cycles, the same as a voice frequency channel, and capable of transmission in both directions.

PART II. Carrier Systems, filters, "G" System. The first article in this series was published in the April 13 issue, page 13.

Each two-way carrier channel, as we have considered it above, in reality consists of two separate and distinct channels—one for transmitting and the other for receiving. This is similar to a situation where one pair of wires is used to connect A's transmitter to B's receiver, and where a second pair of wires is used to connect B's transmitter to A's receiver. With this arrangement, A can talk to B over one pair of wires and B can talk to A over the other pair at the same time, or one message can be transmitted in one direction—say east to west—while another message is being transmitted in the other direction—west to east—each independent of the other. This arrangement, when used, is spoken of as "four-wire." Two-way carrier channels are spoken of as "two-wire," since they serve the same purpose as the ordinary metallic circuit of two wires. In order to utilize a minimum of apparatus and take advantage of maximum utilization of the frequencies, most carrier telephone systems are constructed on a four-wire basis, and equipment is added enabling the four-wire channels to be operated as two-wire channels, as used in ordinary service.

Each of the above carrier systems has certain characteristics, advantages and limitations. Each is best suited to certain needs.

"G" Carrier Telephone System

The "G" carrier telephone system is the simplest. It is designed to provide one carrier channel where a slightly lower level in transmission is permissible. This system has no amplification of speech currents so, whenever it is added to an existing line, the voice frequency circuit is impaired to the extent of the insertion loss of the carrier equipment. Normally, this loss is not noticeable. The carrier channel also has a lower transmission level due not only to the carrier equipment, but also to the higher loss of the carrier currents over the wire line. These considerations limit the use of the "G" carrier system for commercial telephone circuits to circuits not over 50 miles in length having little or no cable, where the distant office has relatively short lines and where the control office is not too far from the toll center. In considering the application of any interexchange facility, whether it be a wire circuit or a carrier channel, the transmission loss from the farthest subscriber to the toll center must not exceed certain limits for good service.

The "G" carrier system is unique in that it only has one active terminal, i.e., that requiring a source of outside power. This active terminal is equipped with the carrier frequency generator for both terminals. For transmission from the active terminal to the inert terminal, this carrier is modulated at the active terminal and demodulated at the distant or inert terminal. During the idle periods and when the active terminal is not transmitting, the carrier frequency is transmitted continuously to the inert terminal. Thus, the inert terminal, when transmitting, modulates the incoming carrier and transmits this modulated carrier back to the active terminal for demodulation.

Filters

At every carrier terminal, several pieces of apparatus known as filters

are used to perform important functions without which carrier operation would be quite impossible. A filter, as the name implies, is a separating device. In telephony, three general types of filters are used which are aptly described by their names:

(1) A low pass filter is one that is designed to pass low frequencies or frequencies below some other filter on the circuit. One important use of the low pass filter is to limit the frequencies transmitted over any voice circuit to the voice frequency band 350 to 3,500 cycles.

In the use of carrier channels and voice frequency channels in the same circuit group, three characteristics must be kept quite uniform, or there will be a noticeable difference in the circuits. Only the better ones will be used, i.e., volume, noise and the band of frequencies transmitted. For this last reason, each voice frequency circuit, over which a carrier system is placed, and each carrier channel of the carrier system is equipped with a low pass filter limiting the frequencies of each of the circuits to the same band width.

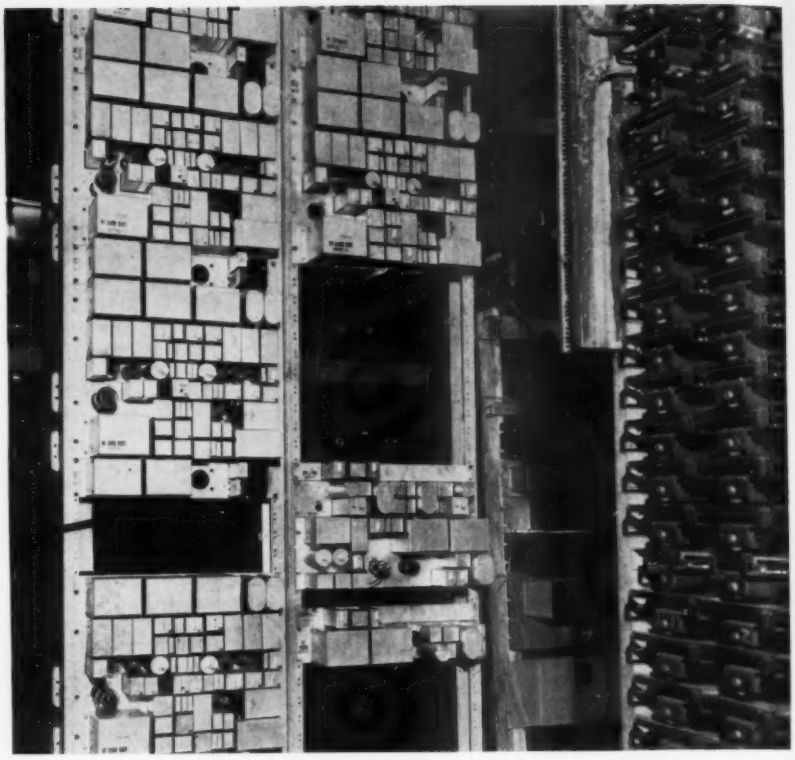
In actual practice, the low pass filters used for this purpose are in reality band pass filters transmitting 350 to 3,150 cycles, or thereabouts. The low cutoff point suppresses interference from superimposed telegraph circuits, interference from power lines, ringing current, and, in general, all frequencies below 300 cycles per second.

(2) A high pass filter is one designed to transmit frequencies above a certain frequency or cutoff point. Filters of this type are used to pass all frequencies above a certain value to the exclusion of frequencies below that value.

(3) A band pass filter is one designed to transmit a band of frequencies between a lower limit or low cutoff point, and up to a certain limit or upper cutoff point.

On any voice channel, the low pass filter is so called because it passes only frequencies below the lower cutoff point of some other filter in the circuit. Thus, the use of a filter largely determines its real name rather than any arbitrary cutoff frequency. So, when we speak of a low pass filter, we mean in all probability a band pass filter with two cutoff points passing a band of frequencies below some other filter and when we speak of a high pass filter, we probably mean some band pass filter that passes a band of frequencies above the band passed by an adjacent low pass filter.

If two filters are connected together on one side, and one is a low pass filter and the other is a high pass filter, then a line is run from this junction to a similar set of filters. Signals, in the low pass group, will pass through the low pass filter to the line, to the far end, through the low pass filter there, to its terminals. And, conversely, a signal in the band of the high pass filter will be transmitted to the distant end and will emerge from the high pass filter; yet, on the line between the filters, both signals can be transmitted at the same time. However, due to the action of the filters, the signals are separated at the distant end, each to its separate channel. Each channel may be used in either direction.



Portion of carrier equipment and repeater bay installed at Everett, Wash.

This arrangement of filters is frequently called a directional filter, for in carrier systems, it is the usual practice to use one channel of the two as above, to transmit in one direction, and to use the other channel to transmit in the opposite direction, rather than to use one channel in both directions. However, since the "G" carrier system uses the same channel in both directions, it cannot, therefore, be operated as four-wire, but only as a two-wire circuit. This is another limitation on its application which will be discussed later.

Whenever a metallic circuit is arranged for carrier system operation, it is spoken of as a "carrier position." For example: We have carrier positions available on pins, No. a and No. b, between city A and city B, meaning that these wires may be used also for a carrier system.

When a carrier system is installed on a carrier position, it is spoken of as being "over voice frequency circuit so and so." This means circuit so and so, by virtue of the installation of the carrier system, now has its frequency band limited to 350-3,500 cycles by the low pass filters in the carrier system, and that there is a carrier system over it. When repeaters are used with low pass filters limiting the frequency to the voice frequency range, the circuit is also correctly spoken of as a voice frequency circuit.

Whenever speaking of a voice frequency circuit, upon which a carrier system is superimposed, it is referred to as being "under carrier system so and so."

Operation of the "G" System

Whenever a conversion takes place over a "G" carrier system, from either teminal, the voice frequency to be transmitted passes through a low pass filter to limit the band of frequencies, passes to the modulator, where it modulates the carrier current, and, thence, through the high pass filter to the line. After passing over the line, the modulated frequency reaches the directional

(Please turn to page 29)

IN THE NATION'S CAPITAL

BY
FRANCIS X. WELCH
WASHINGTON
EDITOR

FCC opens hearings on Western Union's application for increased rates because of higher labor costs. . . . Telephone industry should watch proceedings as a pattern in future rate cases. . . . FCC warns against use of Walkie-Talkies.

LAST week the Federal Communications Commission opened up its hearings on the Western Union plea for increased telegraph rates. It was a full-dress affair—speaking in a regulatory sense — with three state commissioners "sitting in" along side of three members of the FCC. This is in accordance with the protocol of cooperation agreed upon by the state and federal commissioners during the last couple of years regarding proceedings which involve both interstate and intrastate issues.

Chairman of the hearings was FCC Commissioner Ray Wakefield and his two colleagues were Commissioners Paul A. Walker and Clifford J. Durr. The three state commissioners assisting on the bench were: Donald Hacking of Utah, Matt L. McWhorter of Georgia, and Carroll L. Meins of Massachusetts. The state commissioners also were represented at the bar by Frederick G. Hamley, general solicitor of the NARUC, and E. F. McNaughton of the California Railroad Commission staff.

This is likely to prove a rather important case. It may even be the barometer case as to what effect inflationary trends (in the matter of increased operating costs) will have on the future of public utility rates. That, of course, is not what the FCC is going to decide in this case; and the members of the FCC might be a little indignant if any such idea were suggested. But, as a practical matter, here is the first clean-cut major test of a public utility company which has actually been thrown into the "red" financially because of increased wages which it has had to pay as the result of an order of a government agency—the late National War Labor Board.

Specifically, Western Union is asking for approximately a 10 per cent boost in telegraph rates to retrieve some $19,000,000 in revenue. As Western Union President Joseph L. Egan, first witness for the company, told the commission, Western Union now stands to run up a deficit of some $19,000,000 because prevailing telegraph rates will bring in only $183,000,000, whereas the total cost of operation, including the higher payroll expenses for the current year, will amount to some $202,000,000.

This is the direct result of the War Labor Board order of last December 29 — just about the final decree of that agency before it went out of existence—which boosted Western Union payrolls about $23,500,000 a year and granted Western Union workers some $31,000,000 in retroactive wage claims.

The point is that if FCC grants rate increases to offset this operating cost —and it is difficult to see how the commission can avoid granting some large measure of relief along this line —a valuable precedent will be established for other public utilities having similar operating difficulties as the result of increased operating expenses. Of course, each case would have to stand on its own merits. Each utility, whether large or small, interstate or intrastate, would have to demonstrate before the appropriate regulatory agency that it really is falling behind under prevailing rates. But assuming that such a case can be made out, the decision of the FCC in the Western Union proceedings is likely to be a pretty good anchor to the windward for future regulatory reference.

* * *

The fact that Western Union is desperately in need of rate relief is shown in the decision of the OPA not to intervene in opposition to the company's rate increase petition. The OPA general counsel, Richard H. Field, sent a letter to the acting chairman of the FCC, Charles R. Denny, which recognized the "emergency" character of Western Union's plight. Mr. Field's letter stated that OPA should not be understood as approving the actual rate increase proposed; it simply means that OPA does not feel that the situation warrants working up an opposition case. There will be opposition, of course, as well as a good deal of penetrating analysis by the FCC's staff witnesses. The opposition is expected to come from an intervening labor union, the American Communications Association (CIO), represented by its general counsel, Victor Rabinowitz. Also intervening is the Commercial Telegraph Union (AFL), represented by its international representative, Adolph Brungs.

The Treasury Department's Division of Procurement is going to oppose any move to cut out the rate differential which the government now enjoys on telegraph rates. The Treasury is represented by its attorney, David Kosh. The Justice Department is likewise expected to register some opposition.

In addition to President Egan, Western Union developed its case with testimony of two other officials, Walter P. Marshall, treasurer, and Orla St. Clair, special counsel.

Among other points made in his testimony, Egan called for reduction of the present high federal excise tax of 25 per cent on telegrams. He pointed out that it is higher than the so-called luxury tax. Telegrams are not, and should not, says Egan, be placed in the luxury class, and certainly their use should not be penalized by prohibitive taxation which is even in excess of luxury item taxes. What Egan says about telegraph rates is true enough, but also would seem to apply to the heavy excise taxes on telephone exchange service and long distance calls. However, that is not before the FCC.

Egan observed that the telegraph business has an unusually high proportion of payroll expense. Wages absorb more than 75 per cent of all company expenditures. Referring to the possible alternative of government ownership, Egan recalled a public opinion survey made several years ago which showed 76 per cent of the general public and 93 per cent of the businessmen of the nation opposed to such an arrangement. He likewise condemned the proposal for a government subsidy.

* * *

The FCC has just blown the whistle on illegal use of walkie-talkie equipment for civilian radio-telephone communication. It is about time, too—judging from the way some surplus property items along these lines are being discussed, if not actually used, in unregulated circles.

We have all read about or seen pictures illustrating a halcyon postwar period in which loved ones a mile or more apart are to be kept in constant communication by that ingenious radio-telephone contraption, the walkie-talkie. Cynics who hold that it is just as well for loved ones to be out of sight and sound of each other, occasionally have suggested that general adoption of the walkie-talkie would represent change, rather than progress.

However that may be, the walkie-talkie era is, for the moment, being retarded by the FCC, which has issued a solemn warning that use by the general public of Army surplus walkie-talkies may bring a $10,000 fine or two years' imprisonment. That is a high price to pay for the privilege of being in constant communication with a loved one. The FCC reminds that anybody using a radio transmitter must have a federal license. Unauthorized transmission, it says, could lead to tragic interference with aviation, marine, police, fire, and military radio systems.

That is not to say that FCC is brash enough to oppose the walkie-talkie era. On the contrary, it is working on plans to bring it into flower. It contemplates setting up a citizens' radio communications service, to which it has allocated the radio spectrum space between 460 and 470 megacycles. At the moment, the proposed service is waiting for the completion of tests on which rules and regulations will be laid down and for manufacture of the necessary equipment. When all is ready, public announcement will be made and FCC will begin to issue licenses. It promises that getting one will be a simple procedure.

Should you, in anticipation of the dawn of the new era, stock up with one of the Army's surplus walkie-talkies? The FCC says "No." The catch is that none of the Army's surplus sets that has yet come to the attention of FCC is built to work in the 460-470 band. You might have known from the start that if it was surplus, there would be some good reason for your not getting one.

* * *

The U. S. Army has just announced that Oak Ridge, Tenn.—birthplace of the atom bomb, or at least the more important technical phases of it—will hand over its telephone business for private company operation. Heretofore, the Army had, for obvious reasons of military security, closely controlled, as well as operated, the telephone service in this astonishing mushroom city. Actually, of course, the Southern Bell Telephone & Telegraph Co. was furnishing the telephone service all along—through the Army. But now the Army is going to cut the last thread of government control and release the service to the Bell company for usual commercial operation.

Specifically, the Army will discontinue its operation and supervision on a date to be announced after definite plans have been formulated by the telephone company. The program is said to be in line with Army's desire to have Oak Ridge function the same as any other normal community.

Among the advantages of the changeover will be an eventual expansion of telephone service to more Oak Ridge residents, but it was emphasized that this is contingent upon the ability of the company to obtain necessary materials, of which there is a shortage all over the country at the present time.

In making the announcement, Col. P. F. Kromer, chief of Central Facilities and Services Division, pointed out that the Army has operated the telephone exchange, as it has other functions of a like nature at Oak Ridge, since the project was created. Colonel Kromer said of the Army's control:

"Military necessity dictated this course of action, it being essential during the war that the Army should exercise full control over all operations at the project, including its telephone system. Now that these restrictions are no longer necessary, the Southern Bell company has been asked to come into the community and operate the telephone system as it does the telephone system serving other cities in Tennessee and throughout the Southeast. Under the proposed plan the Army will subscribe to the service to the extent required to fill its official needs.

"This is in keeping with the Army's desire that Oak Ridge assume the functions of a normal community as quickly as practicable."

Further information concerning the transfer will be announced when final arrangements are completed, Colonel Kromer stated.

* * *

Among other defections and omissions of character and habits, your correspondent must plead guilty to being no faithful devotee of the society column. He usually passes over, very abruptly, those sparkling passages of beautiful prose in the daily papers which describe the comings and goings, courtships, marriages, and divorces of high society, social diplomacy, and the younger or "horsy" circles. (The latter, sometimes described by cynical newspapermen as the "manure circuit.")

But the other day, in one of the national capital's daily newspapers—to wit, the *Times Herald*—there occurred an item of interest to followers of the current controversy over telephone recording devices. This item was to be found, believe it or not, in a society column by a young lady reporter whose beauty, wit, and wisdom are only surpassed by the amazing variety of incredible hats. To get on with the story, this society columnist tells us that the United States government is going to pay for at least 50 telephone recorders to be installed on the telephones of our United States senators. The following passage is excerpted verbatim from Countess Cassini's (no kidding, her husband stems from Russian nobility) column:

"Something new will be added! . . . With automatic telephone conversation recorders offered to all senators at no cost to them and paid for by us of the U. S., 'the days are gone,' say the gleeful legislators 'when those ? * ffl / / * bureaucrats downtown can tell us one thing on the telephone in the morning and write us something else by letter that afternoon!'

"This apparatus is a miraculous, compact contraption. For instance, while talking into a small mouthpiece you make an instant record of your letter or speech which your secretary plays back when she has time.

"This, of course, relieves wifely anxiety about leg crossing sweater-girl secretaries, there being no longer any excuse for taking dictation while perched on boss's knee.

"Furthermore, by pressing a foot pedal any telephone conversation can be permanently on record.

"For some years governmental departments have enjoyed the benefits of this wonder machine — agencies like OPA, etc., have had the 'goods' on senators after an idle telephone chat and haven't hesitated to use it for wrist-twisting.

"But, aha! The worms have turned!

"Since the Senate has appropriated funds for purchasing and installing these edifying gadgets 50 senators have already rushed to put themselves on the list.

"Unlike the executive departments, which have unlimited telephone privileges, senators are limited to 20 long distance calls a month.

"And the costs of any conversation exceeding three minutes come out of the senator's back pocket. . . . This is one reason why they often reverse charges on home-state telephone calls."

* * *

Last week a sub-committee of the Senate Commerce Committee, under the chairmanship of Senator Pepper (D., Fla.), heard witnesses on the so-called Bailey-Hays Bill to aid "underdeveloped areas." This interesting bill is actually supposed to assist the process of industrial decentralization, so that smaller towns and what might be called the "underprivileged" regions of our nation will get more of a fair share of jobs and commercial opportunity — through the spreading of industry away from the swollen metropolitan areas.

Offhand, this would seem to be a worthy objective; and certainly one which would not do the Independent telephone industry any harm. Independent telephone companies operate chiefly in smaller communities and rural or semi-rural areas which — if not actually underdeveloped—certainly do not enjoy as much industrial activity as those sections through New England and the Middle Atlantic states where there is heavy centralization of industry in large cities.

But like so many other bills which seem worthwhile, as an abstract proposition, this particular measure contains the same familiar pattern of federal subsidy and centralized paternal government. It also contains a provision which would authorize the three cabinet secretaries (Commerce, Agriculture, and Labor) to investigate ways and means for improving telephone and other utility services in so-called "underdeveloped areas" and to investigate alleged "handicaps" which might result from excessive rates or inadequate service for the use of public utility facilities.

This is only a small part of the bill, but it does have mischievous implications. It would seem to duplicate, if not interfere with, the work of the state and federal regulatory commissions which are supposed to be responsible under the law for the maintenance of reasonable rates and adequate service by utilities generally throughout the country. Passage of the Bailey-Hays law in the present form would imply that the state and federal commissions have fallen down on their jobs.

It may be that the congressmen will take such a view of this particular provision of the law before passing it —either by eliminating it or clarifying and limiting the provision so as to recognize the primary responsibility of our duly authorized regulatory authorities.

For that matter, the chances of enactment of this bill are practically nil at the present session of Congress. It is only because the measure has actually gone to the stage of committee hearings that this writer would mention it at all. Probably, proponents of the bill are interested now chiefly in spade work and in developing interest in it, with the idea of making a plea for actual enactment some time next year.

It is rather strange that some labor union elements are supposed to be plugging for this bill, probably with the idea that it might assist the CIO group in its avowed determination to organize industry in the South. It is strange because when industry has itself attempted to "decentralize" voluntarily, it has been accused of running away from established organization, in order to set up shop in a new, unorganized small town community.

The CIO Electrical Workers Union issued such a statement last year, complaining of the fact that both General Electric and Westinghouse—two major manufacturers of electrical equipment —were establishing new factories in small towns here and there. The union charged that the companies were trying to desert the larger areas where union organization was strong.

It is quite conceivable that these factors have entered into the decision of the big electrical companies. But, whatever the reason, it is worth noting that the movement toward industrial "decentralization," of which this is evidence, has been in the books for a long time—and that sociologists and planners have not only been predicting it but have been urging it as the logical answer to some of the problems of our urban civilization. So highly respected a leader of liberal thought as M. L. Wilson, of the Department of Agriculture, has been particularly persistent in urging such decentralization.

The point is that with the coming of electric power, modern telephone communication, motor transport, three of the chief reasons for the concentration of industry in large urban communities disappeared. When power can be shipped in on three small wires, and when the lines of telephone communication can coordinate complicated processes in a half-dozen different communities at once, it is possible to take real advantage of dispersal.

During the war, in fact, just this was done. Some day the story will be written of the immense contribution to war production which was made by the little fellows — the hen-coop machine shops, the village garages which, motivated by a war sub-contract, spilled over into the neighboring barn and produced indispensable small parts at an enormous rate and with a minimum of paper work and industrial bureaucracy. The war demonstrated the advantages of production by small industrial units—and the lesson has not been lost on the big industrial units. It doesn't need golden chains from the U. S. Treasury, either.

TELEPHONY and DIRECTORY Delayed

This issue of TELEPHONY is late because of the curtailed production schedule of printing plants in Chicago due to the rationing of electric power brought about by the current labor controversy in the coal industry. Until an agreement is reached it is certain that the publication of forthcoming issues will be delayed.

Likewise, the publication of TELEPHONY's *1946 Directory of the Telephone Industry*, which we expected to mail by June 1, will be delayed.

The Human Factor in Accidents

It is difficult to figure out just what it is that separates a safe job from an unsafe job.

When 80 per cent of all accidents are directly traceable to faulty supervision, faulty training or faulty workmanship (or combinations of these), it is evident that the human factor is predominant. The question then becomes one of finding out why human beings act the way they do and persuading them to do better. This is a very large order for anyone.

THE PLANT MAN'S NOTE BOOK

BY
RAY BLAIN
TECHNICAL
EDITOR

THE WRITER asked a friend, now stationed in Japan, to send him a pair of Japanese climbers. He claims that he has not been able to find any and that apparently the Japs use them very little. They use ladders on short poles and all high poles are stepped. No wonder they lost the war!

* * *

The first 1,000 mile telephone conversation — New York to Chicago — took place in 1892.

* * *

It seems there may be considerable future use in the communication field for magnetic tape or wire recorders. This equipment should prove especially useful at relay points for facsimile and teletype communication. The signals can be recorded on the tape, then, without rewinding, can be retransmitted backward at a high rate of speed. When these signals reach their final destination they can be run through the required equipment to produce either a picture or a typed message.

* * *

Now we learn that experiments are being conducted, using the cathode ray tube on a test set for the location of telephone trouble. It is claimed that this is better than the hearing method as different individuals have varied hearing reactions which often affect the location of trouble.

* * *

In Irvington, N. J., a telephone man smelled gasoline upon entering a manhole. He reported this to the local fire department which investigated and pumped 500 gallons of high octane gasoline out of the manhole. It was found that the gasoline had seeped into the manhole from a faulty tank in a nearby service station.

* * *

There recently has been developed a simple heat block for first aid use. This device employs a sealed chemical charge replaced more easily than a flashlight battery. No liquids or flame are used. One movement starts the chemical action and top heat is obtained in 60 seconds. This unit weighs only 22 ounces complete, and furnishes one hour's heat per charge. If heat for a longer period is required, another change in the form of a cartridge may be inserted. This is a worth-while addition to any first aid kit carried on line construction or maintenance trucks.

* * *

The proper handling of wraps in the telephone exchange has always been a bothersome problem. Closet or locker space is not generally available and when hung on the wall articles of clothing always present a most unsightly appearance.

The modern steel hat and cloak rack is perhaps the most satisfactory solution to the problem. The rack shown in the accompanying photograph is ideal for this purpose as it provides for large capacity in small space—three or four persons per square foot. This rack also provides shelf space for hats and a rack for umbrellas.

We are in receipt of a letter from H. R. Van Deventer, patent attorney of New York City, in which he makes reference to our item of March 16 issue of TELEPHONY concerning plug seat switches. His letter states in part as follows:

"You would not be trying to resurrect one of the draculas of the telephone business would you?

"The plug seat switch next to the marginal relays we had in the early days probably gave rise to more profanity than any other piece of equipment that I can recall offhand. The idea looked peaceable enough on paper and to the best of my recollection was constructed in order to circumvent claims in some of the early patents having to do with trunking or transfer circuits between operators' positions. I do not know where to put my hand on any literature on the subject right now, but back in 1909 I wrote a book called *'Telephonology,'* in which, on page 163, is a circuit of such a two-way transfer or trunk—sketch of which I enclose.

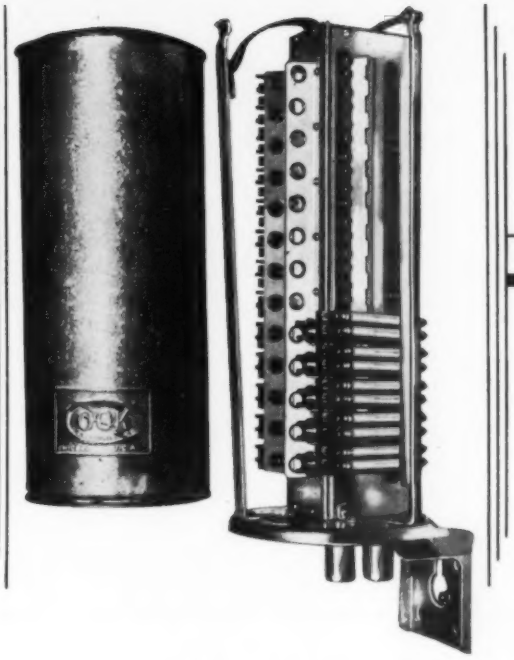
"The operation was as follows: An operator upon receiving a call for a subscriber whose line terminates in a position beyond her reach, completes the connection by ordering the distant operator (over an order wire circuit) to insert the plug end of the transfer circuit, which extends between the two positions, into the desired line.

"When the operator raises the plug of the trunk, the signal lamps are lighted, and the first operator plugs into the outgoing jack of the trunk with the calling plug of the cord circuit used in answering the calling subscriber. The first operator rings the wanted subscriber through the transfer circuit, the same as in making a direct connection and when the subscribers are through talking and ring off the clearing out drop in her cord circuit is thrown.

"When the cord circuit is pulled down the lamp signals at both ends of the transfer circuit are lighted and remain in this condition until the second operator pulls down the transfer plug. This scheme allows an extremely rapid operation and was much faster than the jack ended transfer.

"The trouble with the plug seat switch was not in its design. Both Charlie North and W. W. Dean, who were two of the finest designers of telephone equipment that ever lived, made good plug seat switches, but these had to be located immediately

UA-20



Aerial to Underground
CABLE TERMINAL

by COOK

The UA-20 closely resembles the design of the famous Cook S-20 Pole Cable Terminal. The UA-20 is equipped with two entering nozzles and the cable chamber is equipped with terminating studs for each cable. Protection is provided by the Dual Gap H-20 Protector Unit which connects each aerial cable pair with its adjacent underground pair.

The UA-20 offers many advantages. By simply removing the fuses the overhead and the underground cables are quickly disconnected, permitting testing in either direction. Special test clips with fuse clip adapters and cords are furnished. Service is re-established by reinserting the fuses into the heavy spring clips, which insures constant electrical contact and no resistance loss, an important feature in toll cable transmission.

COOK ELECTRIC Company

2700 SOUTHPORT AVENUE • CHICAGO 14, ILLINOIS

The Facts Grow More
For The Operating Tp
And The Manufactur

The serious and swiftly-moving events of the past week have now made it clear that our recent review of the "cold, hard facts" which telephone companies and the manufacturers must now face was, if anything, too optimistic.

In the few days which elapsed between the writing of that announcement and its appearance in print, the "threatened power shortage" has materialized. Acting on orders from the Illinois Commerce Commission, our factory has again been compelled to adopt a twenty-four hour week.

At the time this is being written—Tuesday, May 7—the end of the coal strike which necessitated the power curtailment is as far off as ever, and its continuance now threatens a complete shutdown of all industry. The threatened railroad strike, also drawing tragically nearer, adds another cloud to an already dark picture.

It is important that Independent telephone companies understand the facts which have led up to these developments so that they will understand, and be prepared for, further inevitable delays in the production and delivery of equipment and supplies they need, and for the steadily increasing costs throughout all industry. Here is a brief review of the facts since the first of the year as they relate to our own production:

By January of this year, our terminations of government contracts were practically completed, and conversion well under way. We were ready to move swiftly into peacetime production.

February brought the steel strike and strikes in other basic industries,

ɔrɛerious
Tphone Companies
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which resulted in shortages of materials which compelled our factory temporarily to adopt a three day week. Those shortages continued to hamper production after the strikes were ended.

In March the situation showed improvement, and production volume began slowly but steadily to increase. In April further gratifying progress was made; we began to "hit our stride."

In the meantime, the coal strike, in progress throughout April, moved swiftly to a climax, resulting in the drastic order for power curtailment throughout the Chicago area. Our gains in production volume have been wiped out, and the situation for the immediate future remains dark and uncertain.

What the ultimate effect of these developments on the telephone industry will be is anybody's guess. But we can be sure that it will not be good.

It is our intention to work to the limit of our ability to bring about a resumption of high speed production at the earliest possible date.

AUTOMATIC ELECTRIC

Originators and Developers of the Strowger Step-by-Step "Director" for Register-Sender-Translator Operation . . . Machine Switching Automatic Dial Systems

Makers of Telephone, Signaling and Communication Apparatus . . . Electrical Engineers, Designers and Consultants

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AUTOMATIC ELECTRIC SALES CORPORATION, 1033 W. Van Buren St., Chicago 7, U. S. A.

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under the plug shelf in a position that was practically inaccessible in the average switchboard, and another thing was that such switches were usually installed in old boards and had to be put in while the boards were in service.

"Some makes of these switches, designed in a hurry, did not have a fibre wheel operated by the plug, but had a metal element at this point which came directly in contact with the sleeve of the plug and in some conditions if the plug was restored before the first operator took her cord circuit down at the jack end of the transfer, weird things would happen on grounded lines, in case of an outside cross, or if the calling subscriber's line carried a heavy earth current.

"A switchboard man in the old days who had a couple of hundred of these plug seat switches to look after was considered fortunate if he did not spend at least one hour of the night on his back gazing upwardly into the cord shelf, and, although he was gazing upwardly, his thoughts were certainly not directed toward anything celestial."

No, it was not our intention to revive any old draculas; however, it is believed worthwhile to occasionally point out some of the old features which had to be endured by the communication field in order that newcomers may realize that real progress has been made in our art.

PLANT MAN'S QUIZ

Q. What is the standard color code used for the conductors of switchboard cords?

A. The following code is generally considered standard:

Tip—White
Ring—Blue
Sleeve—Red

* * *

Q. Will you please explain a Simplex Circuit?

A. This is a grounded circuit which is superimposed on a metallic circuit by the use of repeating coils. Such an arrangement permits the simultaneous operation of a DC telegraph facility and a telephone voice channel over one pair of wires without mutual interference. The DC feature may be either telegraph or teletype.

* * *

Q. What are polarized relays?

A. This type of relay is designed to operate on current flowing in one direction through its windings and remain non-operated on current in the opposite direction. Polarized relays usually have a permanent magnet which exerts a force upon the armature. The permanent magnet either aids for operating the relay or opposing for non-operating by the flux set-up by the operating windings, depending upon the direction of the current through them.

* * *

Q. How can a varistor be used to protect a lamp on a series line lamp switchboard?

A. The varistor is connected in parallel with the line lamp when used for this purpose. The resistance of the varistor will be high at normal voltage and does not materially affect the brilliance of the lamp. However, when excessive voltages are induced on the line, the varistor resistance decreases and thus by-passes the excess current around the line lamp.

* * *

Q. What gauge conductors should be specified for inside house wire?

A. In general, No. 22 B&S gauge may be considered standard for the majority of telephone companies. There are, however, some companies that also use No. 20 and No. 19 gauge wire for this purpose.

* * *

Q. Please describe how a log anchor should be installed.

GUY ROD
VERTICAL DEPTH OF SETTING AS REQUIRED TOMEET LOCAL CONDITION
END OF GUY ROD THROUGH THE ANCHOR LOG WITH WASHER AND NUT ATTACHED
RECESS CUT IN EARTH SO LOG WILL PULL AGAINST IT

A. Ordinarily we do not recommend installation of log anchors, as patent anchors are better and cheaper in most cases. If log anchors are desired, for any special reason, the accompanying drawing indicates how they should be installed.

* * *

Q. Please explain why the cut-off jack is not used instead of a cut-off relay in present day multiple type switchboards.

A. The cut-off jack is a simple and inexpensive arrangement of opening the lamp circuit and removing the battery from a subscriber's line and it still is frequently used on small switchboards.

Formerly, this arrangement was used on large multiple boards, but proved rather difficult to maintain. The cut-off jack complicates the multiple wiring and the jack springs are so located that they are most difficult to reach when adjustment is required. To overcome these difficulties, the cut-off relay now is used for large switchboards for it has the advantage that the jacks are used solely for contacting the plug as the cut-off springs which open the lamp circuit are located on the relay.

* * *

Q. What procedure should be followed to clear central office trouble in a minimum length of time?

A. In order to effectively clear any central office equipment trouble in minimum time, the following points should be carefully considered:

(1) Analyze the trouble report carefully.

(2) Study the circuit diagram.

(3) Locate the trouble by the process of elimination. To accomplish this, use a head receiver equipped with a clip and test point and start testing from battery or ground. Test, in this manner, one step at a time until the trouble is located.

Q. Will it be necessary for us to load a 7/10 mile section of 22-gauge, 26-pair cable?

A. Ordinarily, such a short length of cable would not require loading unless it forms a part of other cables to make up much longer circuits. Cable of this type normally has an attenuation of approximately 1.79 db per mile at 1,000 cycles. This same cable provided with H-88 loading reduces the attenuation to 0.60 db per mile.

OHIO ASSOCIATION EXTENDS *Aid to Small Companies*

By R. C. RENO

Officers of Buckeye Independent group tell of activities to help smaller units to secure financing, and to improve physical plant and service at annual convention.

ONE of the most important activities of the Ohio Independent Telephone Association during the past two years has been its work with the smaller telephone companies, President Ralph F. Mateer and Secretary-Treasurer Lloyd C. Wright stated in their annual reports to the 51st convention of the association, held April 23 and 24 in Columbus.

Commenting upon these activities Mr. Mateer said:

"The backbone of American industry is made up of smaller businesses where owners, employes and customers are close enough together at all times to be interested in the welfare of one another. This certainly is true in the Independent telephone business. It has been our aim to assist the smaller companies in any way we could so they might maintain a healthy financial condition and give to their subscribers the best possible service within the standards demanded by the subscribers, commensurate with the willingness of subscribers to pay for improved service.

"In January, 1945, we sent out to some 170 Class D companies an outline of procedure for filing annual reports with the Public Utilities Commission of Ohio. In this work the Ohio commission has been most cooperative. We have found that the commission is desirous of helping the smaller companies, but has been handicapped by lack of information. We have tried to be the intermediary in bringing some of these companies to the commission and in assisting the companies in presenting information to the commission.

"Our secretary has made visits to headquarters of more than 50 companies. Assistance has been given 20 smaller companies in anticipation of rate increases. At least four of these rate increases are now effective and others are still in progress. We have found some companies hesitant in making rate increases, either through fear of the commission or through fear of adverse subscriber reaction.

"Let me say now that increasing rates is a right that all of us have, if they are needed to insure a proper rate of return upon investment, and we can thank our lucky stars that in Ohio we have a commission that believes that the utility business should be regulated from Columbus, not Washington. Our commission is not opposed to granting rate increases where justified either to provide a reasonable rate of return or to insure the maintenance of high grade of service to the public. we believe the farmers realize that we can solve it better than government agencies. . . .

"In the summer of 1945, a committee of association directors, headed by R. E. Shotts, devised a plan for small companies to obtain loans for needed improvements and new equipment. We sent out questionnaires to telephone companies in connection with the possibility of federal loan assistance. . . . Almost all of the companies expressed a desire to get along without government assistance. In other words, the Independents want to remain Independent."

Secretary Wright, in his annual report, gave a summary of statistics pertaining to the operations of the Independent telephone companies in Ohio and stated that most of them were small companies operating one or a few exchanges. He reported that most of the activities of the association's office the past two years had been directed toward rendering assistance to those companies in financing and improving their physical plant and service. He said that the association's future efforts would be devoted to this cause.

The following directors were elected by the convention:

Roy W. Ammel, Elyria; Allen S. Crane, Portsmouth; L. W. Easton, Newark; Henry George, Ashland; H. E. Hageman, Lorain; Gustav Hirsch, Columbus; C. A. Kern, Germantown; David McKell, Chillicothe; Ralph F. Mateer, Warren; J. Warren Safford, Troy; E. J. Ward, Lima, and Clare E. Williams, Marion.

Officers and directors of the Ohio association photographed prior to their organization meeting.

Other members of the board are: Russell Goebricher, Conneaut; W. C. Henry, Bellevue; Rolland Jones, Athens; Frank L. McKinney, Altadena, Calif.; E. G. Morgan, Eaton, and L. R. Wittemire, Mansfield.

Officers elected were: President, Mr. Crane; first vice president, Mr. McKell; second vice president, Mr. Jones, and secretary-treasurer, Mr. Wright.

The convention was welcomed to Columbus by Mayor James A. Rhodes and response was given by Director Safford.

USITA President W. C. Henry addressed the convention on "Postwar Telephone Problems." He called for the close cooperation of all units of the

industry in solving its problems which, he stated, must be met squarely.

The most pressing and immediate problem confronting the industry, Mr. Henry said, is to fill held orders for telephone service which accumulated during the war.

"With each passing week since last August the understanding and patience of these applicants for telephone service has become lessened. To them the war was finished more than seven months ago. The shortages of station apparatus, central office equipment and outside plant facilities are problems of ours and not theirs. They want telephones now," the USITA president said.

The second and most urgent industry problem, discussed by Mr. Henry, is that of making available telephone service in every rural section within the limits of each exchange area. He said:

"It is generally agreed that in 1920 there were about 2,500,000 telephones on farms. During the following 15 years up to 1935 there was a very considerable loss in rural stations. In the period from 1935 to 1946 the trend has changed, and there has been a substantial gain in the number of rural telephones. This gain assumes even greater significance when it is coupled with the fact that in the same period there was a marked decrease in the total number of farms in the United States.

"The U. S. Census Bureau recently has concluded a count of farms in accordance with its own inclusive definition of what constitutes a farm. Final figures have not been made public and until they are released it is impossible to state with assurance just what is the per cent of present farms which have telephones . . . but whatever the number is, we all agree that it is not as high as we want it to be. The installation of farm telephones is definitely on the increase, and our job is to accelerate in every way possible the present rising curve of farm stations.

"There has been much discussion of the reasons for the decrease in number of farm telephones following 1920. Whatever those reasons were, they are not important now. Not since the early days of our industry has there been such a demand for rural telephones as that which exists today. I believe that demand will continue in the years immediately ahead. This government is committed to farm subsidies, and these payments will be continued in one form or another. A high farm income is assured this year and next year by legislation already enacted. The U. S. Department of Agriculture estimates that income from farms will be 20 billions of dollars in 1946. This compares with 12 billions in 1941.

"Alabama Senator Hill's bill to create a Rural Telephone Authority and several similar pieces of legislation are for the present resting in committees of the Senate and House. The ultimate action that will be taken will depend to a considerable degree upon the aggressiveness with which

H. T. JUILFS (left) telephone engineer of the Ohio Public Utilities Commission, and F. C. DUNBAR, Columbus telephone attorney, discuss problems confronting telephone industry at Ohio convention.

the telephone industry, both Bell and Independent, expands its present rural service. The fact that the telephone industry in the United States has grown to its present status as a private enterprise over the past 70 years does not of itself guarantee adequate rural expansion now.

"The farmers of America are no longer the forgotten men of our national economy. An increasing number of them are going to have adequate telephone service, and if we in the telephone industry do not provide this service, a government agency will. Let us not make the mistake the electric industry made some 12 or 13 years ago. The surest way to protect ourselves from government competition is to solve the rural telephone problem ourselves, and do it without delay.

"On January 1, 1946, the associated Bell companies were serving 1,002,000 rural telephones in approximately 35 per cent of the rural areas of the United States. These Bell companies have publicly announced that within the next three to five years they will add another million rural telephones which would amount to an increase of 100 per cent in their present rural development.

"Accurate figures of rural development in the Independent group are difficult to obtain, but my best information is that there are approximately 1,100,000 rural telephones in the territory of Independent companies, which is roughly 65 per cent of the area of the United States.

"What then is the proportion of this problem for which the Independent operating companies are responsible? First it is apparent that Bell companies have at the present time a considerably greater number of rural telephones in service per square mile in territory served by them than Independent companies have. And second,

H. J. KERLIN, Sidney, Ohio (left), and R. F. LUCIER, Warsaw, Ind., photographed at Ohio convention.

for us in the Independent field to accomplish a comparable saturation in rural telephones, we must add about 1,500,000 rural stations within the next five years. That would be an astounding increase of 140 per cent in number of rural telephones in Independent territory. That is the size of our job in rural telephone development.

"To do that job will require many millions of dollars of new capital for

Photographed at the registration table at the Ohio convention were: (Seated) Registrars JANE PENROD (left), and MRS. BURRIS BOLIN; (standing, left to right) MRS. LLOYD C. WRIGHT, MR. WRIGHT, Ohio association secretary and R. D. HEUSEL, Columbus.

TELEPHONY'S cameraman RAY BLAIN "snapped" these groups of telephone men and women who gathered before and after sessions of the recent Ohio telephone convention.

plant construction. The level of rural telephone rates has always been low, and much of our rural service is furnished at less than cost. In 1935 the average farm income in the United States was $1,124. For 1945 it is estimated to be $2,850, an increase of 153 per cent. In that period of time rates for rural telephone exchange service have remained practically constant. Accordingly, in proportion to his annual income, a rural telephone now costs a farmer less than half as much as it did 10 years ago.

"I repeat, the people in the rural areas of this country are going to have telephones, and in my opinion, they will pay the cost necessary to provide that service. It is a staggering problem which we face, but it must be accomplished. It can be if every operating telephone company in our group clearly realizes its individual responsibility in its own area."

Another major problem listed by the USITA president is the Independent industry's responsibility to provide an improved standard of toll and local service in its territories, both as to quality and quantity. He stated:

"Attainment of a proper standard of service by large Independent companies is not the complete answer. To raise the level of service generally the service of Class C and D companies must be improved even more than the average as the entire telephone industry is affected by the standard provided by all telephone companies—both large and small."

To bring about a betterment of the over-all standard of Independent service, Mr. Henry said that the larger companies must spend the necessary time and effort to counsel with, advise and in every way possible assist their adjoining smaller operating companies.

He also emphasized that, with the Independents finding themselves caught squarely between rising costs and fixed service rates, there must be a general increase in the level of local service rates if they are to secure adequate revenues necessary to improve telephone service. He said that too many of the small companies have operated on a basis of providing the quality of service which inadequate revenues permitted, rather than providing the quality and amount of service subscribers desire and asking service rates to meet resulting costs.

"In attacking our postwar problems, let us apply the same enthusiasm, initiative, cooperation and leadership, which in other critical times have provided the turning point between uncertainty and clearly defined progress. Those qualities will assist us in solving our problems; those qualities will enable us to push ever onward toward greater goals than we have so far achieved," President Henry concluded.

Harold L. Mason, chairman, Public Utilities Commission of Ohio, in a forthright and aggressive address on

"State Regulation of Telephone Companies," deplored the effort of federal government agencies, particularly OPA, to encroach upon and interfere with the jurisdiction of state regulatory commissions. He stated that the state commissions had the responsibility of regulating utility rates and that the OPA had no rightful place in state regulation. He also expressed sympathy to telephone companies in performing the difficult task of meeting the public's demands with shortages of equipment and manpower and with constant harassment of federal agencies.

In commenting upon the outstanding performance of the telephone industry in Ohio and on its need of adequate revenues to render efficient service and to produce a reasonable earning rate, Mr. Mason stated that in 30 years the number of subscribers and plant investment of telephone companies in Ohio had doubled, while revenues had increased only 24 per cent. This, he said, should cause some concern in the industry.

The commission chairman made frank and pointed observations regarding some of the problems of the industry. Regarding the rural service situation, he stated that the Ohio commission was interested in seeing that farm service is improved and expanded and that it should be of prime importance to the Independent industry. He urged all companies, particularly the smaller ones, to take immediate steps to give adequate service to the rural areas as poor service in those communities reflected unfavorably on the over-all service given over the state and the nation.

Regarding proposed legislation that would create a Rural Telephone Authority, Mr. Mason said that whether or not such legislation is enacted depends on how the industry faces its responsibility to the rural areas, however, he said he knew the problem would be taken care of by the industry.

In connection with the current federal minimum wage legislation, the commission chairman said that if the minimum wage rates were raised many small telephone companies either would have to increase their rates to cover such increased costs or go out of business.

The duties of a state commission in telephone regulation, Mr. Mason stated, are to (1) See that the public gets good telephone service; (2) see that rates for such service are reasonable and (3) see that those rates are adequate for telephone companies to produce good service and to maintain a sound condition, as without adequate rates a company cannot render good service or stay in business.

He concluded by stating that by working together the commission and the industry can give the public better telephone service and strengthen the position of "weak" telephone companies.

In an interesting illustrated address, Paul H. Nelson, research associate, Ohio State University, told of the development and work of "Radar During the War."

Maj. Russell Johnson, Columbus, engineer, Gustav Hirsch Organization, officer in charge of the 92nd Signal Battalion, U. S. Army, which was one of three battalions organized and sponsored as affiliated units by the Ohio association, gave a vivid picture of the operations of the 92nd during the war. The battalion was in actual front line combat duty for 10 consecutive months without relief and Major Johnson paid high tribute to the spirit and accomplishments of the unit in providing communications to 50 command posts of various artillery, infantry, airborne and cavalry divisions.

Perry T. Ford, director, Ohio Department of Highways, gave an interesting explanation of a plan for Ohio to spend $40,000,000 per year on road construction for the next three years. Mr. Perry stated that all telephone companies are interested in public roads not only in Ohio, but in the entire nation because these same roads carry telephone lines. It is Ohio's plan to outline a six-year road building program, three years of which will be positive at all times in order that utility companies may make their plans well in advance of the actual time they must move poles or plan the construction of new lines.

John A. Dawson, Columbus, transmission and protection engineer, Ohio Bell Telephone Co., gave a most interesting talk on "Carrier Circuits—Radio and Television." Mr. Dawson cited the problems which will face telephone companies in connection with frequency modulation when these companies are called upon to furnish wire circuits between broadcast transmitters and studios. He advised telephone companies not to alarm the radio people by charging too much for this service for this may force them into using radio links for this purpose. Telephone companies should keep these construction charges to a minimum and absorb the cost in rentals, if possible, he warned. The difficulties which may be expected in providing circuits for television were explained briefly.

The various types of Bell carrier systems were explained and compared. It was pointed out that many problems remain to be solved on power line carrier systems for rural telephone service. Six channel carrier systems now are being used experimentally for rural service. Mobile radio and how it will be used for commercial telephone service was discussed and a few of its problems were indicated.

COMING CONVENTIONS

Wisconsin Independent Telephone Association, Park Hotel, Madison, May 14, 15 and 16.

New York State Telephone Association, Hotel Onondaga, Syracuse, May 22 and 23.

Pennsylvania Independent Telephone Association, Hotel Roosevelt, Pittsburgh, June 6 and 7.

North Dakota Telephone Association, Hotel Gardner, Fargo, June 10 and 11.

Washington Independent Telephone Association, Spokane Hotel, Spokane, June 14 and 15.

Oregon Independent Telephone Association, Multnomah Hotel, Portland, June 21 and 22.

California Independent Telephone Association, Miramar Hotel, Santa Monica, June 27 and 28.

Michigan Independent Telephone Association, Hotel Olds, Lansing, September 18 and 19.

United States Independent Telephone Association, Stevens Hotel, Chicago, October 14, 15 and 16.

North Carolina Independent Telephone Association, Pine Needles Hotel, Southern Pines, November 11 and 12.

Alabama Independent Telephone Association, Jefferson-Davis Hotel, Montgomery, November 18 and 19.

Georgia Telephone Association, Henry Grady Hotel, November 21 and 22.

NEW LENS FOCUSSES RADIO WAVES

New metal lens, developed by Bell Laboratories, can focus radio waves into the sharpest beam of its kind ever produced. Designed primarily for telephone network application, new type lens is expected to be of value in transmitting pictures, radio broadcasts and television programs.

A REVOLUTIONARY metal lens capable of focussing radio waves as an optical lense focusses light, has been designed and developed by Dr. Winston E. Kock and his associates on the technical staff of the Bell Telephone Laboratories, Inc., New York City, where scientists are grooming it for an important role in tomorrow's communications systems.

The new lens is expected to find its most widespread application in microwave radio relay systems such as the New York to Boston channel now under construction. Similar systems, developed secretly at the laboratories for the armed forces during the war, distinguished themselves for superior, dependable communication under rigorous combat conditions in both the European and Pacific theatres.

While these new systems are designed primarily as adjuncts to the telephone network, they are expected to find additional use in transmitting pictures, radio broadcasts and television programs. Aside from its use in such microwave communications systems, the lens also is expected to be of value in the peacetime development of radar as an aid to sea and air navigation.

Operating at tremendously high frequencies—nearly five billion cycles a second with a wave length hardly as long as a cigarette, microwave transmission offers several advantages, among them freedom from static and most man-made interferences.

A major problem in developing such communications, however, has been that of transmitting and receiving the wave energy in the form of a narrow beam like a searchlight. The very short waves used in microwave communications, unlike longer commercial broadcasting waves, do not follow the curvature of the earth but shoot off into space. Thus they can only be transmitted and received as far as there is a clear, unobstructed, straight-line path, at best as far as the horizon.

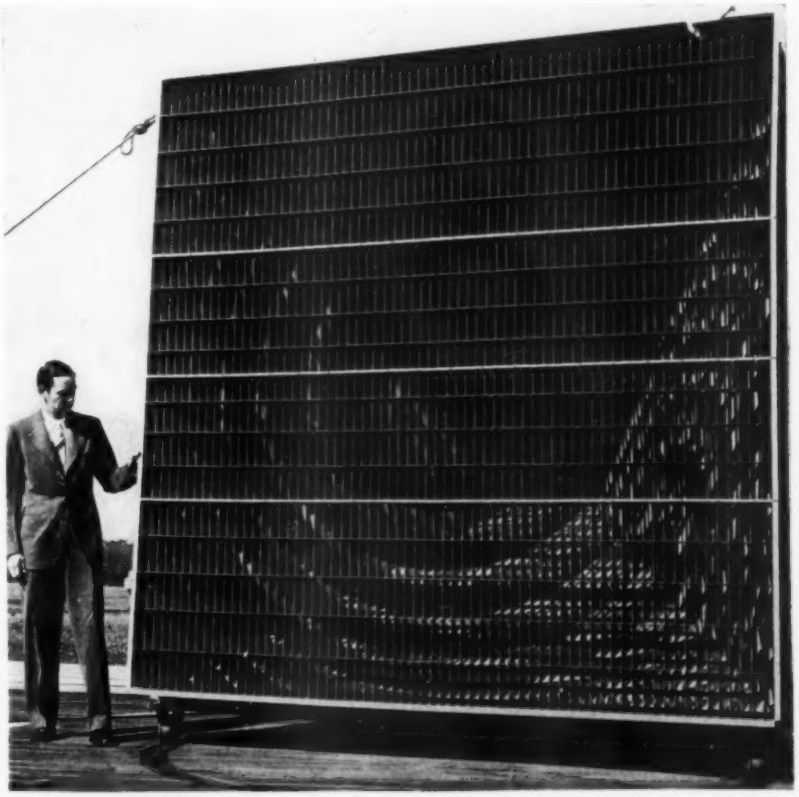
Communication over longer distances requires the use of relay stations so that the ultimate distance is traversed by a series of intermediate transmissions. New York to Boston transmission, for example, will be made in eight jumps. To obtain this short-range transmission between successive relay stations with peak efficiency and least interference, the wave energy must be focussed into a narrow beam.

The new metal lens, which can focus radio waves into the sharpest beam of its kind ever produced, has solved this problem and thus given tremendous impetus to the development of microwave communication.

It operates on a principle roughly akin to that of a simple convex magnifying glass which can focus the sun's rays to burn a hole in a sheet of paper. The action of the glass is to delay the advancing wavefront by an amount that is greatest at the center of the lens, where the glass is thickest, and least at the tapered periphery. As a result, the wavefront, behaving somewhat like a line of soldiers, is reformed and headed so as to converge toward a point. This change in the velocity of a wavefront is a fundamental principle of all lenses.

Since radio waves are of the same electromagnetic nature as light waves, it has been known theoretically for some time that radio lenses might be built on this principle. Previous to the advent of microwaves, however, there was an insuperable obstacle in the very much greater wave length of radio waves, which in the commercial broadcasting band range from an eighth to a third of a mile. For a lens to be effective, it should have a diameter of at least several times the wave length and this would have meant a lens almost a mile wide.

As radar and radio relay communications systems developed during the war, they created a demand for more and more sharply focussed beams and



Revolutionary metal lens which can focus radio waves much as an optical lens focusses light is shown with its designer, Dr. Winston E. Kock of Bell Telephone Laboratories, Inc. It is expected to find its most widespread immediate use in microwave radio relay systems such as the New York to Boston channel now under construction, which will use lenses of this type. The lens also holds promise of many other important applications.

for several years, Bell Telephone Laboratories explored the possibilities of solid lenses of plastics and other dielectrics as part of its microwave studies.

It was in pondering this problem that Dr. Kock thought back to waveguides, those hollow tubes which one of his colleagues had devised some years earlier to conduct microwaves and which, in war, were to play so vital a role in supplying a physical channel for radar signals.

It was known that radio waves undergo a speeding up, or increase in wavefront velocity, when they pass along such a tube or between metal plates and that the total advance of the wavefront could be fixed by controlling the length and contour of the plates and the distance between them.

It occurred to Dr. Kock that an array of metal plates could be designed to focus radio waves just as effectively as a solid lens might focus them if due regard were given to the fact that the edges of the wavefront would be advanced rather than retarded in transit. Such a structure would also be easier to build, move and maintain than an equivalent solid lens type.

The necessary design theory was worked out in mathematical detail and systems of metal plates were subsequently built to duplicate the action not only of convex and concave lens but also of other optical devices, such as half and quarter wave plates and prisms.

Before the advent of the metal lens, microwaves were often focussed by means of the familiar "dish" antenna, in which a beam is projected in early parallel lines after reflection from a paraboloid. Their manufacture, however, demanded extremely exacting tolerances and they were often hampered by shadowing effects, which are eliminated in the new lens. The reflectors also required extremely accurate adjustment which could easily be knocked out by unexpected jars. This is not the case with the metal lens.

Metal lenses which have been made, range in size from table-top models only 18 ins. in diameter and two ins. thick to 10 and 20 ft. giants. The type to be used on the New York to Boston hook-up is 10 ft. square. The energy is fed through a wave guide behind the lens and then the waves spread out along a horn-like shield into the lens which then focusses them into a pencil-beam. A similar combination of lens and shield at the receiving end takes in the waves and performs the reverse operation of focussing the energy into a wave guide from which it passes into the system for further disposal.

Developed towards the end of the war, the metal lens had only limited use in military operations.

INDEPENDENT PIONEER MEMBERSHIP PASSES 3,000 MARK

THE MEMBERSHIP of the Independent Pioneer Telephone Association has passed the 3,000 mark, J. K. Johnston, secretary-treasurer, reported to the association's board of directors at its meeting April 16 in Chicago. This is an all-time record and Association President Roy W. Siemund, Chicago, told the directors that the New Members Committee had reported that by October 1, the end of the association's fiscal year, it expected to increase the membership to 3,500.

Those attending the Pioneer directors' meeting were: President Siemund: Oscar Burton, Tyler, Tex.; G. B. Foscue, Wilmette, Ill.; R. A. Lumpkin, Mattoon, Ill.; R. C. Reno, Chicago; Ray W. Smith, Chicago, and Secretary Johnston. Directors Walter Dakin, Madison, Wis., and Kelley McNish, Bristol, Tenn., were unable to attend the meeting.

The directors instructed Secretary Johnston to proceed with the publication of the 1946-47 Independent Pioneer Roster for distribution at the annual USITA convention this fall. Because of the paper shortage, publication of the roster was discontinued in 1944.

The directors spent considerable time discussing ways and means to bring about a greater participation in the activities of the Pioneer association by individual members, which has been a subject of consideration of the board for some time. It was felt that the development of a hobby program for Independent Pioneers would be one activity which would be of interest to many association members. Discussion centered on a plan providing for a "hobby" booklet, in which descriptions of hobbies of Pioneers would be given from time to time, and including provision for Independent Pioneer hobby exhibits at annual USITA conventions.

The board directed that a letter be sent to all association members to secure their reaction to such a plan and President Siemund appointed Pioneer Director Foscue as chairman of the Hobby Committee to complete plans for the project. Other members of the committee will be named later.

The directors also voted to urge state associations to give more prominence to the Independent Pioneer association in their convention programs and entertainment and to extend the cooperation of the national organization to the association chapters in planning their meeting and entertainment programs.

Also, President Siemund appointed a committee to consider a change in the association's by-laws which would provide for the formation of Pioneer clubs in addition to chapters, which could be organized within specific telephone operating and manufacturing companies.

Plans for the 1946 annual Pioneer banquet and entertainment program, which will be held during the annual USITA convention in October, were discussed and President Siemund appointed Director Reno chairman of the Banquet and Entertainment Committee to make plans for this year's affair. Other members of the committee will be appointed at a later date.

» By 1880, the telephone had become so popular in England that it was used to report debates direct from the House of Commons to the typesetters of the London "Times." This made unnecessary stenographic scripts of the debates which had to be prepared and then written before they were ready for the press.

V V

» The first telephone exchange in London was installed in 1879, with Samuel Insull as the first telephone operator and George Bernard Shaw one of the employes.

Carrier Systems

(Concluded from page 14)

filters at the distant terminal, it passes through the high pass filter to the demodulator, where the carrier frequency is removed and only the voice frequency currents pass through the low pass filter, and thence over the carrier channel to the listener. This arrangement of transmission — carrier channel to band pass filter, to modulator, to directional filter, to line, to directional filter, to demodulator, to band pass filter, to carrier channel—is basic. It is the absolute minimum of equipment for any system. Nevertheless, some circuit elements may be combined, e.g., in the "G" terminals, since the carrier frequency is the same in both directions and the circuit is two-wire, the modulator and demodulator at each terminal are combined, the one circuit element performing both functions. It is then called a *modem*.

With reference to the frequencies used in the "G" system, the oscillator, or carrier current generator, operates at 10,300 cycles, per second, and the frequency band transmitted is 350 to 3,500 cycles, per second. Therefore, the demodulated frequency will consist of the first upper side band (the sum of the carrier and signal frequencies) 10,650 to 13,800 cycles per second, and the first lower side band (the difference) 9,950 to 6,800 cycles. In this way, the system operates over a band of frequencies from 6,800 cycles to 13,800 cycles. The high pass filters pass this entire band, and the low pass filters pass only the 350-3,500 cycle voice band. There are other side bands resulting from modulation; however, these are not transmitted due to the upper cutoff point of the high pass filter. More information will be given on this subject later when we discuss modulation in more detail.

(To Be Continued)

V V

Directs College Funds Drive

WALTER F. COZAD, retired general manager of the Northwestern Bell Telephone Co., has been named director of a campaign to raise $500,000 for buildings at Doane College, a Congregational institution located at Crete, Neb. Since his retirement in 1940 Mr. Cozad has directed several fund campaigns, including the 1946 national foundation for infantile paralysis.

Suitable for remote mounting from the control panel
Self-contained unit for the smaller d-c requirements
Simplest, lowest-cost Diverter-Pole design
Gasoline-motor driven Diverter-Pole where complete freedom is desired from an electrical power supply
Semi-portable design for parallel operation

What the USER needs determines HOW EP *designs it*

There is only one major rule that governs the design and manufacture of an E.P. Diverter-Pole Battery Charger. It is: "What are the specific needs of the User?" The Electric Products Company follows rigidly this basic concept . . . and E.P. users confirm it.

Years ago, E.P. learned that ordinary standard commercial machines and design practice could not meet satisfactorily the widely varying direct-current requirements of Telephone Exchanges. The result has been that since 1923, Diverter-Pole Battery Chargers have been proving continuously that they provide MORE value for LESS overall cost.

For the most reliable, maintenance-free and efficient source of direct current, specify E.P. Diverter-Pole Battery Chargers.

Ask for Bulletin 96-A

EP X-18

THE ELECTRIC PRODUCTS COMPANY
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COURTS and COMMISSIONS

Hill City, Kan., Subscribers Want New Telephone System

Olin Walker, manager of the American Telephone Co., Hill City, Kan., has announced that a survey for a new telephone system there revealed 97 per cent of the patrons favored it.

Upon approval by the Kansas Corporation Commission of the increased rates necessary for the new system, plans for its installation will be made as soon as material and manpower become available, Mr. Walker said.

V V

R. H. Hyde Takes Office Of FCC Commissioner

Rosel H. Hyde took his oath of office on April 17 as a commissioner of the Federal Communications Commission, to fill the unexpired term of the late Governor William H. Wills who died on March 6. The term expires June 30, 1952. Mr. Hyde was appointed commissioner by President Harry S. Truman on March 21, and was confirmed by the Senate on April 12. He had been general counsel of the commission since March 30, 1945.

Mr. Hyde is a legal resident of Banock County, Idaho, where he was born in 1900. He attended grade school in Idaho, high school in Salt Lake City, the Utah Agricultural College, Logan, Utah, and George Washington University, Washington, D. C., where he completed his law course in 1929. He has been a member of the bar of the District of Columbia since 1928, having been admitted upon examination before completion of his law course, and is a member of the bar of the Supreme Court of the United States.

Mr. Hyde entered government service in 1924 on the staff of the Civil Service Commission as the result of a competitive Civil Service examination. He held various positions in the clerical and administrative classifications prior to 1928 when he became associated with the Federal Radio Commission. Since his employment with the Federal Radio Commission and its successor, the Federal Communications Commission, he has been employed in

R. H. HYDE

legal positions of varying degrees of responsibility beginning with that of assistant attorney and continuing progressively through the positions of associate attorney, attorney, attorney examiner, senior attorney, principal attorney, assistant general counsel and general counsel, the position which he held when appointed by the President to be a member of the commission.

In connection with his duties over the period of this employment, he has participated in many hearings on individual cases as well as many proceedings and studies relating to development of regulations. These proceedings include the first general allocations proceeding held by the Federal Radio Commission in 1928, hearings under Section 307 of the Communications Act conducted in 1935, the network investigation of 1938, and the recent general allocation hearings. He has assisted in preparations for various international conferences and was a member of the United States Delegation to the Third Inter - American Telecommunications Conference held in Rio de Janeiro in 1945.

V V

Rate Reductions Approved For North Carolina Company

The North Carolina Utilities Commission on April 24 announced approval of new business and residential telephone rates for the Concord (N. C.) Telephone Co.

One-party business rates were reduced from $4.50 to $4.25 and two-party rates were reduced from $3.75 to $3.50. One-party residence rates were reduced from $2.75 to $2.50 and two-party residence rates were reduced from $2.25 to $2.00.

V V

Rural Line Owners Urged To Organize Single Company

Owners of rural lines in the territory of Barnesville, Minn., meeting April 4 with farmers, business and professional men to study ways and means of providing better communications there were urged by J. C. Crowley, Jr., secretary of the Minnesota Telephone Association, to "get together, organize a single company . . . and build a telephone service that will last a long time."

Mr. Crowley stated that he would be glad to check the figures after an appraisal of approximate cost was made, and go over the ground with them.

Cooperation also was assured by A. N. Fancher, supervisor of telephones of the Minnesota Railroad & Warehouse Commission and Northwestern Bell Telephone Co. representatives who also were present at the meeting.

In the discussion it was pointed out that only approximately 10 per cent of the residents in Barnesville have telephones as compared to the 53 to 55 per cent average in Minnesota, and that the few who do have telephones are handicapped by old equipment and poor lines that go beyond the actual Barnesville switchboard.

Mr. Fancher declared that many similar complaints received by the commission are the result of outmoded equipment in many small Independents and likewise urged that instead of having six to eight small companies, reorganization into a single company would alleviate the dilapidated conditions now existing.

Files for Incorporation

The Pleasant View Telephone Lines Co. of Potter, Neb., has filed articles with Nebraska's secretary of state as a non-profit corporation. Arthur Schuessler is president.

V V

Summary of Commission Rulings and Hearings

Federal Communications Commission

May 16: Hearing on application of Northwestern Bell Telephone Co. for authority to acquire Stuart exchange of Iowa State Telephone Co.

Arkansas Public Service Commission

May 28: Show cause hearing on discontinuance by 70 Arkansas companies of differential rates on handsets.

California Railroad Commission

April 26: Applications filed by Manteca (Calif.) Telephone Co. and Ripon (Calif.) Telephone Exchange for orders authorizing changes in directory advertising rates.

April 26: Dismissed complaint of J. R. Cautrell et al vs. G. D. and P. E. Geis, Pacific Telephone & Telegraph Co.

Illinois Commerce Commission

May 7: Hearing on request of Cheneyville (Ill.) Telephone Co. for authority to increase rates.

May 7: Hearing on petition of Dongola (Ill.) Home Mutual Telephone Co. for authority to raise rates.

May 7: Hearing on joint petition of Illinois Telephone Co. and Clayton (Ill.) Telephone Co. for sale of the latter company to the former.

May 8: Hearing concerning unsatisfactory service rendered by Woodland (Ill.) Telephone Co.

May 8: Hearing on request of Grantfork (Ill.) Mutual Telephone Co. for authority to increase rates.

Oklahoma Corporation Commission

May 15: Hearing continued from May 1 on application of P. B. Odom, Tourist Camp & Lumber Yard, Oklahoma City, for telephone service from Southwestern Bell Telephone Co.

May 29: Investigation by commission of rates charged by Sasakwa (Okla.) Telephone Co.

Utah Public Service Commission

May 13: Hearing on interstate toll rates of Mountain States Telephone & Telegraph Co.

Wisconsin Public Service Commission

April 30: Heard application of Wisconsin Telephone Co. at Rice Lake for authority to increase rates.

V V

OBITUARIES

A. C. CRAGG, former auditor of the Tri-State Telephone & Telegraph Co., St. Paul, Minn., died April 9 in Coral Gables, Fla., where he had moved following his retirement in June 15, 1937.

Mr. Cragg for many years was general chairman of the accounting division of the United States Independent Telephone Association and had been actively associated with the Tri-State company for 30 years.

* * *

JOHN E. ZEMPTER, 72, secretary treasurer of the Falmouth & McKinneysburg (Ky.) Telephone Co. since its organization in 1919, died March 14 at his home in Falmouth, following a brief illness.

* * *

LESTER W. SEGUINE, manager of Sylvan Lake Telephone Co., Inc., Hopewell Junction, N. Y., and fire commissioner of the town of East Fishkill, died April 27 in his home. His age was 56.

He leaves a widow, a son, a daughter, his mother, two brothers and a sister.

* * *

CARL H. MOTE, 61, for many years president and general manager of the Northern Indiana Telephone Co. and the Commonwealth Telephone Corp., died April 29 in his home in Indianapolis, after a long illness.

RECONVERSION COMPLETED

Like the bewildered ex-GI who finds civilian clothing sizes curtailed and has to buy a 44 when he wants a 36, many war-boom cities have found it hard to grow into their expanded production facilities.

No Shortages Here!

Not a war-boom city, Terre Haute, Indiana, the "population center of the United States," has grown gradually through the war years, made the conversion to peacetime production swiftly. With an estimated population of 70,000 this rail center on the banks of the Wabash is an average, enterprising American city.

There was no heavy war-time expansion here, yet Telephone Directory advertising revenue showed a steady increase during the war years.

The Loomis Advertising Company has, since 1934, brought about an increase in revenue in every *single issue!* Advertising revenue for the November, 1945 issue totalled 350.1% of the July, 1934 directory.

Remember, this is an average, typical example of the application of Loomis "know-how." That "know-how" can be used to equal advantage in *your* city, town or village, *no matter what the size!*

Roland T. Beard, Vice-President, 502 Gettle Bldg., Ft. Wayne, Indiana, will be glad to discuss with you the sales experience that resulted in the sale of 28 million dollars' worth of advertising for utility companies during the past 22 years, and personally invites your inquiry.

Loomis ADVERTISING COMPANY

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506 Olive St., St. Louis 1, Mo. • 20 West 9th St. Bldg., Kansas City 6, Mo.
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ALL the strength and durability inherent in steel are combined---with definite economies---in *Crapo* Galvanized Steel Strand. Heavy, ductile, tightly-bonded zinc coatings, applied by the famous *Crapo* Galvanizing Process, provide lasting protection against corrosion.

Ask the distributor of *Crapo* Galvanized Products near you or write direct for further information!

INDIANA STEEL & WIRE CO.
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Murdock

TELEPHONE SETS

• MURDOCK'S experience in telephone and communications equipment covers half a century of leadership.

Here is a durable standard-type telephone receiver. "Solid-built" construction throughout. Very sensitive, it gives smooth, clear reproduction of voice tones. Equally adaptable for home or office use. 80 ohms resistance. Moulded in lustrous black bakelite.

An attractive, heavy-weight base in black moulded bakelite with metal bottom and rubber feet. Built-in on-off switch. Simple to install. Long service life.

Write for Catalog

WM. J. MURDOCK CO.
224 Carter St., Chelsea 50, Mass.

J. N. Johnson, F. A. Genin Join Ohio Consolidated

The Ohio Consolidated Telephone Co., Portsmouth, Ohio, an operating company of the Telephone Bond & Share System, has named J. N. Johnson general superintendent, according to an announcement by A. S. Crane, president of the company. Mr. Johnson is expected to take up his new duties on May 15.

During the past six years, Mr. Johnson has been general manager of the Ashland (Ky.) Home Telephone Co., where he has become widely known both through his work in the telephone field and through his civic activities in that area. In his new capacity, he will have general supervision over the plant and operations of the Ohio Consolidated company's exchanges serving 39 communities in various parts of Ohio.

Mr. Johnson is immediate past president of the Kentucky Independent Telephone Association, a member and director of the Ashland Rotary Club, a member of the Ashland Board of Trade, and a director of the Ashland Community Chest. He will shortly take up residence at Portsmouth, headquarters of the Ohio Consolidated company.

Mr. Crane also announced the appointment of Floyd A. Genin as plant superintendent of the Ohio Consolidated company. This position was formerly held by John J. Moran, who in June, 1945, became general manager of the Middle States Utilities Co. of Missouri, another company of the Gary Group.

Mr. Genin, who recently was released from active service with the United States Navy, has had long experience in the telephone business, and prior to the war was employed by the Commonwealth Telephone Co., Madison, Wis. He is a graduate of Notre Dame and also studied at Harvard University.

Mr. Genin will make his home at Portsmouth.

V V

Huether to General Directory; Succeeded by C. E. Williams

H. J. Huether, Jr., resigned as vice president and general manager of the Ohio Associated Telephone Co. effective April 15 to accept the position of vice president of the General Telephone Directory Co.

Mr. Huether's new duties with the General Directory company will consist of intercompany relations and promotional work. He will be temporarily located in Long Beach, Calif., but ultimately will be located in Chicago.

H. J. HUETHER, JR.

Mr. Huether joined the Ohio Associated company in September, 1943, when he succeeded J. T. Carliss as vice president and general manager. From 1935 to 1943 he was group commercial superintendent of the Eastern group of the General Telephone System. Before becoming associated with the General group he was telephone engineer of the Public Service Commission of Pennsylvania for six years. From 1923

Say "As Easy As
PULLING POLES"

. . . and prove it with Simplex No. 329 Pole Pulling and Straightening Jack. 15-tons Capacity. Height 37¾", lift 22".

A full 15 tons of power enables one or two men to quickly pull or straighten any pole. Also a man-hour saver when moving loaded poles. "I" beam base assures firm footing; tough chain snubs pole. For small poles, No. 325; capacity 5-tons.

Simplex
LEVER - SCREW - HYDRAULIC
Jacks
Templeton, Kenly & Co.
Chicago (44), Illinois
Better, Safer Jacks Since 1899

C. E. WILLIAMS

to 1929 he was a member of the plant engineering department of the Bell Telephone Co. of Pennsylvania.

Mr. Huether will be succeeded by Clare E. Williams, executive vice president of the Pennsylvania Independent Telephone Association. Mr. Williams began his telephone career in April, 1926, at Erie, Pa., with the Mutual Telephone Co., later the Pennsylvania Telephone Corp. He served successively in the installation, equipment and commercial departments.

In 1933 Mr. Williams accepted the position of district commercial supervisor with the Ohio Associated Telephone Co. at Marion and subsequently was promoted to division commercial superintendent. In August 1940, he returned to Pennsylvania as district commercial manager for the Pennsylvania Telephone Corp. at Johnstown, a position which he held until his appointment on April 12, 1940, to the position of executive vice president of the Pennsylvania association.

V V

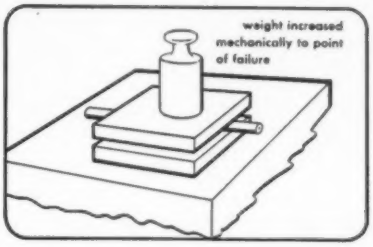
Military Government Needs Personnel in Korea

Secretary of War Robert P. Patterson in a recent letter to William C. Henry, president of the United States Independent Telephone Association, outlined the need of special communication executives and technical personnel to assist the military government operations in Korea.

Operations in Korea have proceeded to the point that General MacArthur has deemed it imperative that certain key personnel in the field of civil communications assist in the rehabilitation of communication facilities. General MacArthur considered the need so important that he sent one of his staff

TELEPRENE
DROPWIRE

COMPRESSION RESISTANCE TEST



Specimen wire is submitted to increasing pressure between two flat steel blocks.
Crushing of insulation indicates limit of Compression Resistance.

This test shows that TELEPRENE has 80% more Compression Resistance than our Standard Weather Proofed Drop Wire.

The difference in cost, per drop, is PENNIES,
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Prices, delivery and samples obtainable through your nearest GraybaR *Office*

Order Teleprene by WHITNEY BLAKE Catalogue No.
17TBP-R Reinforced Parallel
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THE WHITNEY BLAKE CO.
New Haven, Conn.
Well Built wires since 1899

SINCE
1889
NATCO
CLAY CONDUIT
The proved and standard Protection for Underground Telephone Cables.
Cheapest in the long run. Highest quality and a full line of shapes.
National Fireproofing Corp.
202 E. Ohio Street, N. S.
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"Endurance"
TELEPHONE WIRES
RUBBER—PLASTIC
DROP—BRIDLE—INTERIOR
DUCT—FIXTURE—TREE
GROUND
Our personnel is experienced in working to exacting specifications, utilizing advanced techniques and modern equipment.
For prices and delivery direct inquiries on your requirements to
GENERAL INSULATED WIRE WORKS, INC.
PROVIDENCE, RHODE ISLAND

officers, Maj. Gen. S. B. Akin, to Washington, D. C., to present his needs to the War Department.

Secretary Patterson in his letter to Colonel Henry stated:

"For immediate assignment to the Bureau of Communications, Korea, the following executive and technical personnel are urgently required: One communications executive; two branch managers; one telephone inside plant engineer; one telephone transmission engineer, and one supply expert on American commercial communications equipment."

General MacArthur has advised Secretary Patterson that in view of the liberated status of Korea, the personnel selected will function on an advisory rather than a supervisory or control level.

Colonel Henry has outlined to the War Department the acute manpower shortage of competent personnel in the telephone industry and advised the department that the matter might best be brought to the attention of the industry by referring it to the trade journals.

Description of the positions open for immediate assignment are given below. Anyone interested may communicate directly with *Colonel B. H. Pochyle, in care of the War Department, Civil Affairs Division, Washington, D. C.* Colonel Pochyla's telephone number is REPublic 6700, extension 74574, Washington, D. C.:

(A) COMMUNICATIONS EXECUTIVE: Under director recommends policies, operation, maintenance, construction, telephone, telegraph, radio, postal systems, Southern Korea. Also postal insurance system. Supervision Bureau, Korean personnel through Korean executives. Established procedure in Bureau. Trains Korean executives in communications work. Also ability supervise whole bureau in absence military director.

Qualifications: Ten to 15 years responsible executive experience with large industry or government service, prefer experience in telephone, telegraph, radio or postal service but not necessary. Knowledge broad budgetory procedures essential. College degree and graduate work business administration suitable for three to five years of experience.

(B) BRANCH MANAGER (two needed): Responsible operating communications systems of district covering half of Korea. Advises Korean district superintendent on policies, procedures, technical problems in operations, telephone, telegraph, postal systems of district, also postal insurance system.

Qualifications: Eight to 12 years responsible executive experience large industry or government service. Prefer experience telephone, telegraph, radio or postal fields. Education: College degree and graduate work business administration substitutable for three years experience.

(C) TELEPHONE INSIDE PLANT ENGINEER: Advises Korean personnel on technical engineering problems, operation, telephone systems, inside plant, including telephone carrier and teletype terminal equipment, installation repair and maintenance. Also advise on rules, regulations, operational procedures, plant construction and maintenance.

Qualifications: Eight to 12 years experience with work on difficult complicated problems, telephone, telegraph, inside plant engineering including automatic telephony. Education college degree electrical engineering or engineering physics for the degree five years added experience required.

(D) TELEPHONE OUTSIDE PLANT ENGINEER: Advises Korean personnel on technical problems, operations, procedures, rules, regulations involved inside plant engineering, construction and maintenance involving overhead and underground carrier circuits.

Qualifications: College degree electrical engineering or five years additional experience to eight to 12 years responsible experience in work with difficult complicated problems in telephone outside plant engineering, including intermediate telephone repeaters and line transpositions for carrier equipment.

(E) TELEPHONE TRANSMISSION ENGINEER: Advises Korean personnel on operations, procedures, technical problems, necessary rules, regulations involved in telephone transmission system, Korea. Authorized new construction, advises on maintenance of system, trains Korean personnel in technical procedure.

Qualifications: College degree electrical engineer or engineering physics with eight to 12 years responsible engineering experience with work on difficult complex problems, telephone transmission systems and inspecting, instruction and advising engineering viewpoint on design long lines involving open wire and underground carrier borne circuits.

(G) COMMUNICATIONS SUPPLY EXPERT: Advises Korean personnel on planning requirements, all supplies necessary to bureau including new necessary for operating Korean telephone, telegraph system, Korean radio operations, postal system, medical supplies for insurance hospitals, devises procedures, procurement storage, issue said equipment, advising on necessary property records and train Korean personnel in supply procedure.

Qualifications: Three to five years administrative experience U. S. Army signal supplies. College degree electrical engineering desirable.

V V

Concord, N. C., Company To Lay Underground Cables

The Concord (N. C.) Telephone Co. has announced plans for placing cables in the downtown section of Kannapolis, N. C., underground and expanding its facilities throughout that area.

Lester D. Coltrane, Jr., secretary of the company, said that the improvements will require several years to complete.

Commonwealth Schedules Huge Expansion Program

The *News*, employe magazine of the Commonwealth Telephone Co., Madison, Wis., recently announced that the Commonwealth company plans to spend more than $1,000,000 to expand and improve its operating telephone property.

The company's plan calls for expansion of present central office and outside plant equipment to permit the installation of telephone service for waiting customers. The company will intensify its activities, which were retarded during the war years, to build extensions to serve many new prospective rural telephone users. Toll plant will also be expanded in areas where increased customer usage has made them inadequate for purposes of providing good toll service.

Exchange dial conversions scheduled for completion in 1946, include Lone Rock, Loganville, Plain, Mindoro, Edgar, Black Creek, and Nichols.

Buildings to house dial central office equipment for exchanges planned for conversion in 1946 have been completed or are under construction at the present time. Commercial surveys of each of the exchanges are now underway or shortly will be to acquaint the public with dial telephone service and inform it of new rates to be requested in connection with the improved type of service.

The Commonwealth company is also ordering dial equipment for installation at Reedsville, Whitelaw, Birchwood, Marathon, Springbrook, Ithaca, Ridgeway, Barneveld, Argyle, Hubertus, Johnsburg, and North Lake. These installations are scheduled for completion in 1947.

Major conversions to be started in 1946 and currently scheduled for completion in 1947 include Plymouth, Richland Center, and Wisconsin Dells exchanges. Engineering and architect's plans are already under way.

The company will undertake a major building addition at Wausau to house additional dial equipment, as well as provide additional office space. The outside cable plant will be expanded during the year in connection with central office equipment additions.

At Prairie du Chien, Portage, Edgerton, Lake Mills, Seymour, Owen, Minocqua, Waterloo, Reedsburg, Lac Du Flambeau, Winter, and Holmen, the Commonwealth company is also providing for equipment additions to relieve overtaxed central office facilities. This work is scheduled for completion in 1946.

EXCEL CABLE HANGER

The latest development in cable hangers.

- *Provides larger bearing area*
- *No ring cuts, cannot injure lead sheath*
- *Eliminates saddle rings and grade clamps*
- *Easily installed without tools*
- *Reduces maintenance costs*
- *EXCEL Cable Hangers are made in standard sizes or to your specifications.*

WRITE DIRECT OR TO YOUR DISTRIBUTOR FOR SAMPLE AND PRICES.

EXCEL INCORPORATED

2304 NO. NARRAGANSETT AVE., CHICAGO 39, ILL.

GOLD SEAL TAPE

Jenkins Bros. also make Diamond Seal Friction and Rubber Tapes which meet ASTM and Federal specifications.

Watch the tough, long "teeth" form when you unwind it! A sure sign of stronger adhesive power . . . assurance of a tighter, longer-lasting, safer job. Gold Seal insulates with one thickness . . . stays tacky in cold weather, yet doesn't smear in hot weather. Doesn't peel or ravel. Sealed in cellophane, then boxed, to stay fresh. A good supply house near you stocks Gold Seal friction and Rubber Tape. Jenkins Bros., Rubber Division, 80 White St., New York 13.

JENKINS

Gold Seal Tapes
FRICTION and RUBBER TAPES

MADE BY JENKINS BROS . . . MAKERS OF FAMOUS JENKINS VALVES

Carolina T&T Schedules Expansion Program

The Carolina Telephone & Telegraph Co. has announced a $226,000 expansion and improvement program at Dunn and Erwin, N. C., which includes the installation of a dial system at Dunn and the installation of more than 300 new telephones at Erwin.

The work, which is scheduled to be completed during the year, will give Erwin complete telephone facilities for the first time, and for the first time Dunn and Erwin, which are only a few miles apart, will be on the same lines.

The program calls for spending $66,000 for exchange equipment, $40,000 for cable and other plant and $20,000 for additional building space at Dunn. These figures do not include outside plant, wiring and telephones to be installed at Erwin.

V V

Lincoln T&T Resumes Construction at Plattsmouth

The Lincoln (Neb.) Telephone & Telegraph Co. has resumed construction of a new headquarters building at Plattsmouth, an important toll center, plans for which were drawn before the war. This is the first of 47 exchanges that have been scheduled for dial conversion in the company's postwar program, and will be the 31st of its 118 exchanges to furnish dial service.

The company has sold its exchange properties at Hastings, another important center, but has purchased lots upon which a modern building giving dial service will be erected as soon as the present building restrictions are modified.

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WANTED TO BUY: One magneto, common battery or PBX switchboard in good condition. Write 401 Labor Building, Raleigh, N. C.

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WANTED: By two veterans. Telephone exchange of from 300 to 500 company owned stations. Midwest preferred. Give full particulars. Write Box 2268, c/o TELEPHONY.

WANTED TO BUY: Used, type No. 8, Automatic Electric desk magneto handsets. Write Comfrey Rural Telephone Co., Comfrey, Minn.

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